What must we know about biodiversity?

Stuart L. Pimm

Doris Duke Professor of Conservation Ecology

Nicholas School of the Environment, Duke University, USA

President, SavingSpecies

What do we know about species extinction?

How can we use our science to prevent extinctions?

What are the limitations of that science?

Species of birds, mammals, and amphibians are going extinct at 100 - 500 species extinctions, per million species per year.

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REVIEW SUMMARY

BIODIVERSITY STATUS

The biodiversity of species and their rates of extinction, distribution, and protection

S. L. Pimm,* C. N. Jenkins, R. Abell, T. M. Brooks, J. L. Gittleman, L. N. Joppa, P. H. Raven, C. M. Roberts, J. O. Sexton

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ON OUR WEBSITE

Read the full article at http://dx.doi.org/10.1126/science.1246752

*All of the papers discussed in this talk are available for free download at ResearchGate; the graphics are online as indicated

The "background rate" of extinction is closer to 1 extinction per 10 million species per year.

I.e. extinctions are happening 1000 times fast than they should be

Conservation Biology

Contributed Paper

Estimating the normal background rate of species extinction

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*Molecular phylogenies provide critical evidence for background extinction rates in this 2015 paper, but I do not have time to discuss them tonight

What do we know about species extinction?

How can we use our science to prevent extinctions?

What are the limitations of that science?

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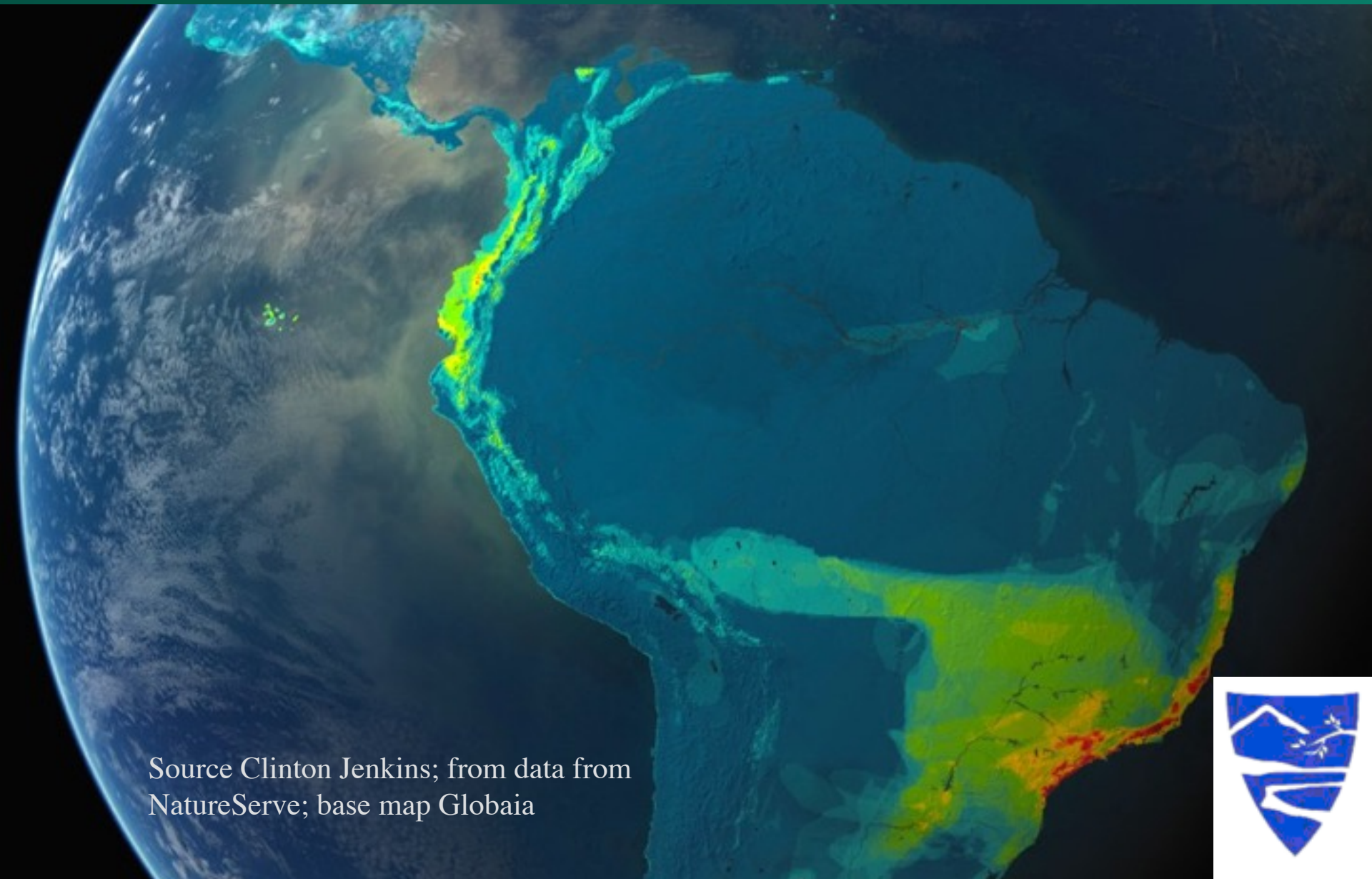
Threatened birds



Source Clinton Jenkins; from data from NatureServe; base map Globaia

insert video

The problem with fragments

286 | NATURE | VOL 496 | 18 APRIL 2013

SPLINTERS OF THE AMAZON

Decades after Thomas Lovejoy isolated fragments of the Brazilian rainforest in a grand experiment, researchers are building on his legacy around the world.

BY
JEFF TOLLEFSON

Ecologist Thomas Lovejoy tucks his trousers into his socks with a casual warning about chiggers and then hikes off into the Amazon jungle. Shaded by a tall canopy and dense with ferns and underbrush, the old-growth forest looks healthy, but Lovejoy knows better. Three decades ago, the surrounding forest was mowed

generation of 'fragmentologists', who are working around the world to understand the cascade of ecological impacts that follow human development. Most notably, in early April, an international team started chopping down trees in Borneo as part of an nearly £6-million (US$9-million) experiment that replicates and extends the Brazilian one.

promote the preservation of extensive areas of intact forest. "It's the most important ecological experiment ever done," says Stuart Pimm, a conservation ecologist at Duke University in Durham, North Carolina, who has collaborated on the project. "We knew that small and isolated was bad, but we needed to know how bad."

The science 1: fragments are bad

Ferraz et al. PNAS 2003 show that small fragments lose more species and they lose them very much faster than large ones

Rates of species loss from Amazonian forest fragments

Gonçalo Ferraz*†, Gareth J. Russell*, Philip C. Stouffer‡§, Richard O. Bierregaard, Jr.‡¶, Stuart L. Pimm†, and Thomas E. Lovejoy‡‖**

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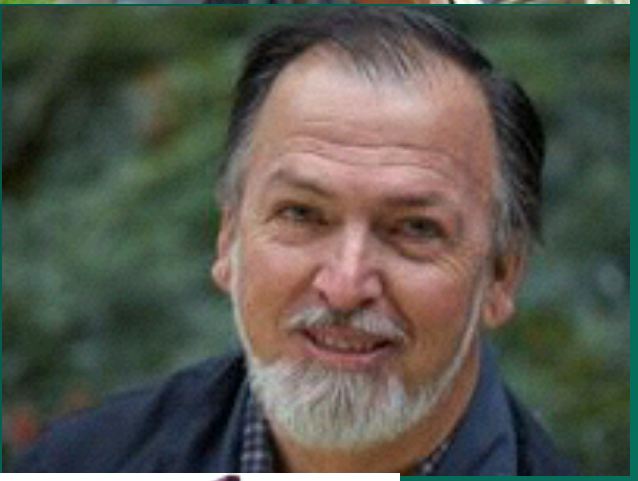
Communicated by Paul R. Ehrlich, Stanford University, Stanford, CA, March 28, 2003 (received for review January 21, 2003)

Saving Species

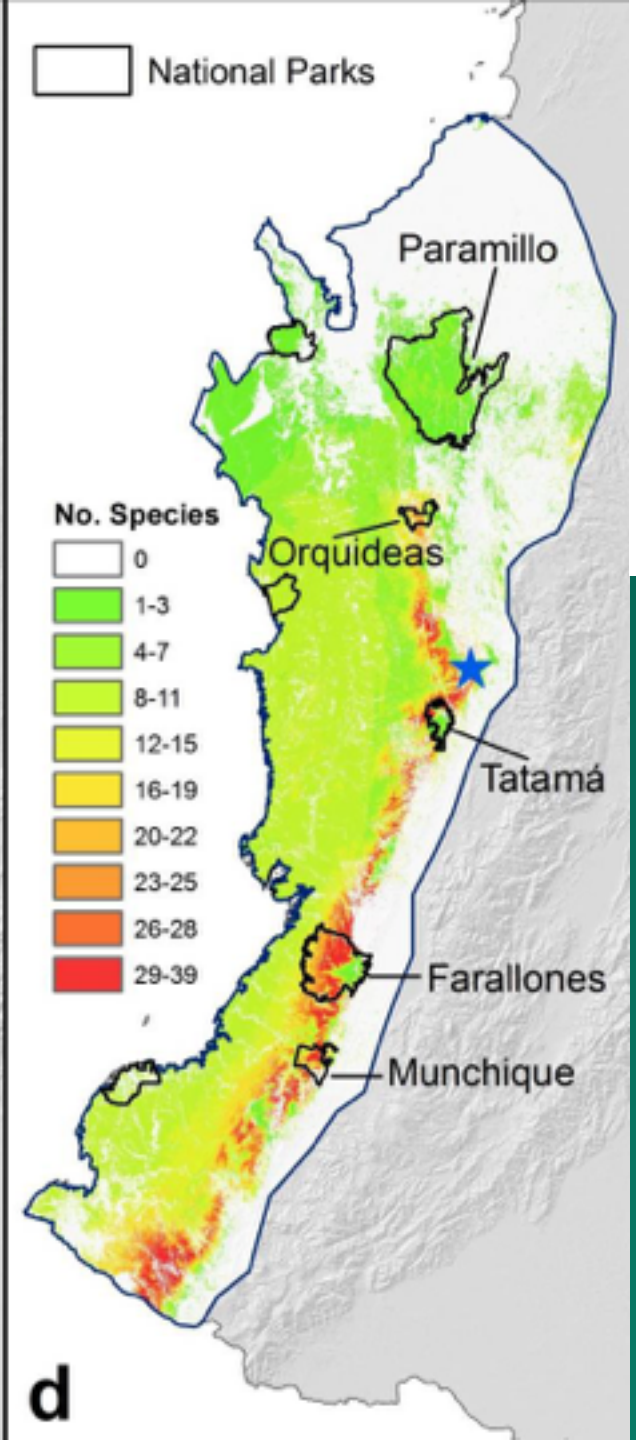


SavingSpecies announces the gift to Fundación Colibrí $100,000 for the purchase of more land to connect the corridor at La Mesenia

The Hummingbird Conservancy

Saving Species

The science 2: which fragments do we re-connect?



Conservation Biology

Contributed Paper

Setting Practical Conservation Priorities for Birds in the Western Andes of Colombia

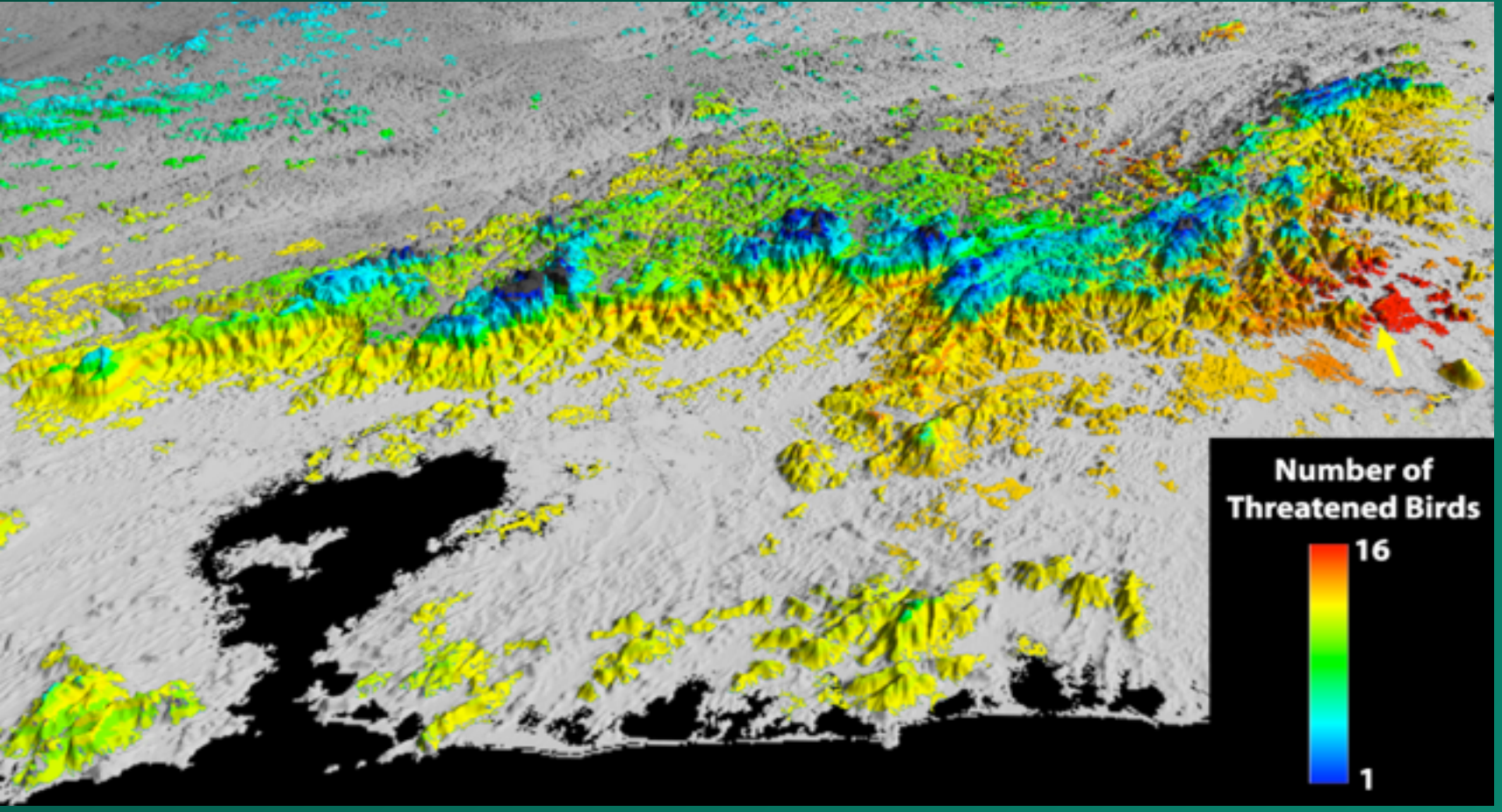
NATALIA OCAMPO-PEÑUELA† AND STUART L. PIMM*

Nicholas School of the Environment, Box 90328, Duke University, Durham, NC 27708, U.S.A.

Abstract: *We aspired to set conservation priorities in ways that lead to direct conservation actions. Very large-scale strategic mapping leads to familiar conservation priorities exemplified by biodiversity botspots. In contrast, tactical conservation actions unfold on much smaller geographical extents and they need to reflect*

We must now move from strategic mapping – hotspots – to tactical mapping at a scale where we can effect practical conservation actions

Saving Species



Natureza & Conservação
Brazilian Journal of Nature Conservation

Essays & Perspectives

Natureza & Conservação 9(2):152-159, December 2011

Handling Editor: Maria Lucia Lorini
doi: 10.4322/natcon.2011.021

How Conservation GIS Leads to Rio de Janeiro, Brazil

Clinton Neil Jenkins[1], Stuart L. Pimm[2] & Maria Alice dos Santos Alves[3]

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[2] *Nicholas School of the Environment, Duke University, Durham, NC, United States of America*
[3] *Departamento de Ecologia,Universidade do Estado do Rio de Janeiro – UERJ, Rio de Janeiro, RJ, Brazil*

We combine ranges, elevation and remote sensing of forest cover

The science 3: What to expect?


5/2/2007
2003
2012
Image © 2014 DigitalGlobe
492 m
2003
Google earth
Imagery Date: 5/2/2007 22°26'09.01" S 42°04'21.42" W elev 87 m eye alt 2.81 km


© 2014 Google
Image © 2014 CNES / Astrium
492 m
2003
Imagery Date: 5/4/2013
Saving Species


Saving
Species

What do we know about species extinction?

How can we use our science to prevent extinctions?

What are the limitations of that science?

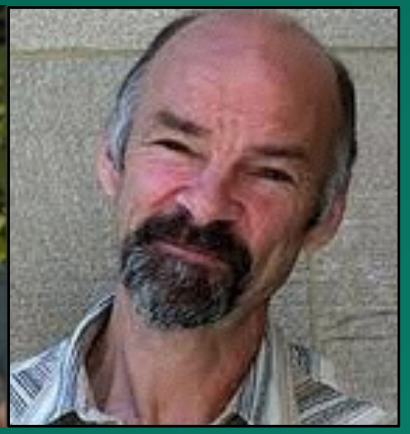
We do not need to know all species

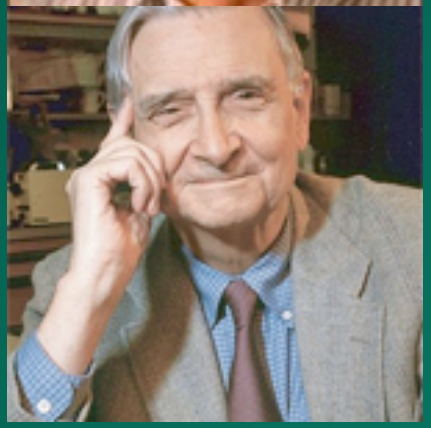
But we do need to have good surveys of a variety of taxa

They need to be near-complete, or else we will miss rare species

And they must be geographically comprehensive — or else we will miss the areas where endemics concentrate





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SavingSpecies invites your tax deductible contribution to preventing the loss of species
www.savingspecies.org